REMARKS

Claims 1-9 are pending. No new matter has been added by way of the present amendment. For instance, the amount of compounds (A) and (B) in claim 1 has been amended as supported by the present specification at page 10, paragraph [0040] and page 11, paragraph [0042]. Additionally, the life test has been defined as outlined in Example 1, at pages 18-19 of the present specification. Additionally, the recitation of "tertiary aryl amine" in claim 1 has been changed to "triarylamine" and the recitation of "luminescent layer" has been removed in claim 1. Similar amendments have been made to claims 6 and 7. Newly added claims 8 and 9 are supported by originally filed claim 1 as well as paragraphs [0040-0044] of the present specification. Accordingly, no new matter has been added.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Issues Under 35 U.S.C. §102(b)

The Examiner has rejected Claims 1-3, 6 and 7 under 35 U.S.C. §102(b) as being anticipated by Hatwar et al., U.S.P. 6,475,648 (hereinafter referred to as Hatwar '648). Applicants respectfully traverse this rejection.

As a preliminary note, Applicants point out that Hatwar '648

was filed in the United States on June 8, 2001 and issued on November 5, 2002. As such, this reference does not qualify as prior art under 35 U.S.C. §102(b), as cited by the Examiner. However, it does appear as though this reference qualifies as prior art under 35 U.S.C. §102(e). Accordingly, it is a rejection under 35 U.S.C. §102(e) that Applicants will address.

Distinctions Between the Present Invention and Hatwar '648

Applicants respectfully submit that Hatwar '648 fails to anticipate the present claims. In particular, Hatwar '648 fails to suggest or disclose a method capable of producing an organic electroluminescent material in which impurity (A) and impurity (B) are kept below the levels required by the present claims. The Examiner has stated that "purifying the crude tertiary amine by sublimation or distillation by the reaction of a haloaryl compound with an aryl amine does not make the end product of the instant application different from the Hatwar product." Applicants respectfully submit that this is incorrect.

Hatwar '648 is incapable of preparing a material meeting the presently claimed limitations. Accordingly, there can be no inherent anticipation of the presently claimed subject matter based upon Hatwar '648. In order to provide evidence supporting this conclusion, Applicants have prepared experimental evidence, which is attached hereto in the form of a Declaration pursuant to 32 CFR §1.132. The Declaration shows that conventional methods,

such as the methods which Applicants submit are utilized by Hatwar '648 are incapable of achieving the low levels of impurities according to the present claims. Hatwar '648 does not specifically disclose a method of purifying a triarylamine. Accordingly, the Declarant has conducted research into conventional methods for preparing triarylamines for use as organic electroluminescent materials. A review of the Declaration reveals that products prepared utilizing these conventional methods are unable to meet the low levels of impurities required by the present claims. Accordingly, no anticipation based upon Hatwar '648 exists. Reconsideration and withdrawal of this rejection is respectfully requested.

Issues Under 35 U.S.C. §103(a)

The Examiner has rejected Claims 1 and 4 under 35 U.S.C. §103(a) as being obvious over Hatwar '648 in view of Shi et al., U.S.P. 5,593,788 (hereinafter referred to as Shi '788). Applicants respectfully traverse this rejection.

As pointed out above, Hatwar '648 is incapable of producing the material containing the low levels of impurities as currently claimed. Shi '788 fails to cure these deficiencies, thus, there exists no *prima facie* of obviousness. Based upon this argument alone, Applicants submit that the outstanding rejection is improper and should be withdrawn. However, even if the Examiner has hypothetically established a *prima facie* case of obviousness,

unexpectedly superior results are achieved by the present invention as compared to the primary reference of Hatwar '648. For instance, the Examiner's attention is directed to Example 1 of the present specification, in particular the structure of the hole transporting layer and the luminescent layer. The hole transporting layer was formed from triarylamine (NPB) and the luminescent layer was formed from tris(8-quinolinolato)aluminum (AlQ). It is understood that the life of the device changes if the material for the hole transporting layer or the luminescent layer is changed.

Applicants submit that the foregoing is clarified by comparing data of Example 1 with data of Example 6 (with the layer material different from that of Example 1) in the application concerned. Note that, Hatwar '648 has a feature that at least two dopants are contained in the host material used for the luminescent layer for improving operational stability of the organic EL device and the dopants have proper energy levels. In the four devices shown in Fig. 6 of Hatwar '648, all of the luminescent layers include the dopants, and thus the time in which the devices exhibit 10% decrease of luminance yield (initial luminance) exceeds 100 hours. This structure is definitely different from the layer structure with no dopant of Example 1 of the application concerned. In other words, even though Devices E to H shown in Fig. 6 and Tables 1 and 2 of Hatwar '648 each have the luminescent layer containing AlQ, the

layer further contains the dopant(s). Meanwhile, Device A shown in Fig. 6 and Tables 1 and 2 of Hatwar '648 only uses AlQ.

Applicants thus submit that the device of Hatwar '648 assumed as substantially equivalent to the device of Example 1 of the application is Device A (understanding the distinctions discussed above). Referring now to Fig. 4 and Table 1 showing the lifetime of Device A reveals that the time in which the device exhibits 10% of the luminance yield (initial luminance) does not exceed 100 hours.

This attests to the fact that triarylamine (NBP) used for the hole transporting layer in Hatwar '648 cannot meet the requirements of the present invention.

Next, the measurement conditions of Example 1 of the application concerned are as follows:

The organic EL device thus prepared was driven continuously under application of direct current in a dry atmosphere at a constant current density of $10mA/cm^2$. Emission of green light with a voltage of 5.0 V and a luminance of 350 cd/m^2 was confirmed initially and it took 105 hours for the luminance to attenuate 10% or 290 hours to attenuate 20%.

In general, large current density leads to bright luminescence of the device but shortens the life of the device. On the other hand, small current density leads to poor luminescence of the device but prolongs the life of the device. Therefore, a precise comparison cannot be made unless the

measurement conditions are specified.

Further, Device A of Hatwar '648 attains a luminance yield of 3.17 cd/A (634 cd/m^2) under a current density of 20 mA/cm^2. In contrast, present invention attains an initial luminance of 350 cd/m^2 under a current density of 10 mA/cm^2. As known in the art, the life of the device is substantially in inverse proportion to the current density based on the principle of the organic EL luminescence induced by the current. Judging here from Fig. 4 of Hatwar '648, Device A requires about 20 hours to exhibit 10% decrease in luminance. Therefore, it can be concluded that the time required for Device A to exhibit such decrease never reaches 100 hours even if the device is measured under the same conditions as the present application.

The data regarding the life-time test is also described in Shi '788 (refer to Table 2). The measurement thereof is, however, conducted under AC driving conditions (i.e., AC bias condition). In contrast, the measurement in the present application is conducted with DC driving conditions. As known in the art, AC driving involves an extremely small initial luminance decrease. Provided that the measurement of Shi '788 is conducted under DC driving conditions, the life-time is presumably shortened to the same level as Device A of Hatwar '648.

Shi '788 has the feature that the operational stability of the organic EL device is attained by stabilizing the structure of the dopants in the fluorescent emitting layer. As pointed out of

the Office Action, Shi '788 describes that the hole transporting material is an aromatic tertiary amine, with triarylamine (NPD) being preferred. However, how the aromatic tertiary amines contribute to the improvement of the operational stability is not described in the publication at all.

With regard to the prolongation of the life of the organic EL device, a method of causing the luminescent layer to include dopants and efficiently converting a supplied electric energy to light energy is generally adopted as mentioned in cited documents. There is no citation describing that the life of the device can be prolonged irrespective of the material for the luminescent layer by controlling specific impurities in the adjacent hole transporting layer.

Accordingly, Applicants submit that the Examiner has failed to present hypothetical *prima facie* case of obviousness. Reconsideration and withdrawal of the outstanding rejection is respectfully requested.

If the Examiner has any questions concerning this application, please contact Craig A. McRobbie, Registration No. 42,874 at the offices of Birch, Stewart, Kolasch & Birch, LLP.

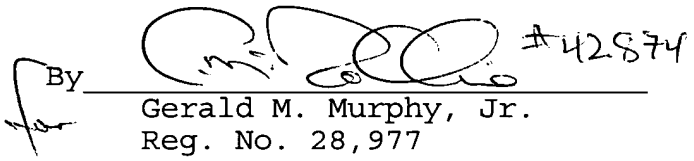
Pursuant to 37 C.F.R. 1.17 and 1.136(a), the Applicants respectfully petition for one (1) month extension of time for filing a reply in connection with the present application, and the required fee of $110.00 is attached.

If necessary, the Commissioner is hereby authorized in this,

concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By  #42,874
Gerald M. Murphy, Jr.
Reg. No. 28,977

GMM/CAM:cms

P. O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

Attachment: Declaration Under 37 CFR §1.132